



## *Mission Need*

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# *Unmanned Underwater Vehicles for Very Shallow Water Mine Neutralization*

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**EOD Requirements**

**Chief of Naval Operations (N757F)**

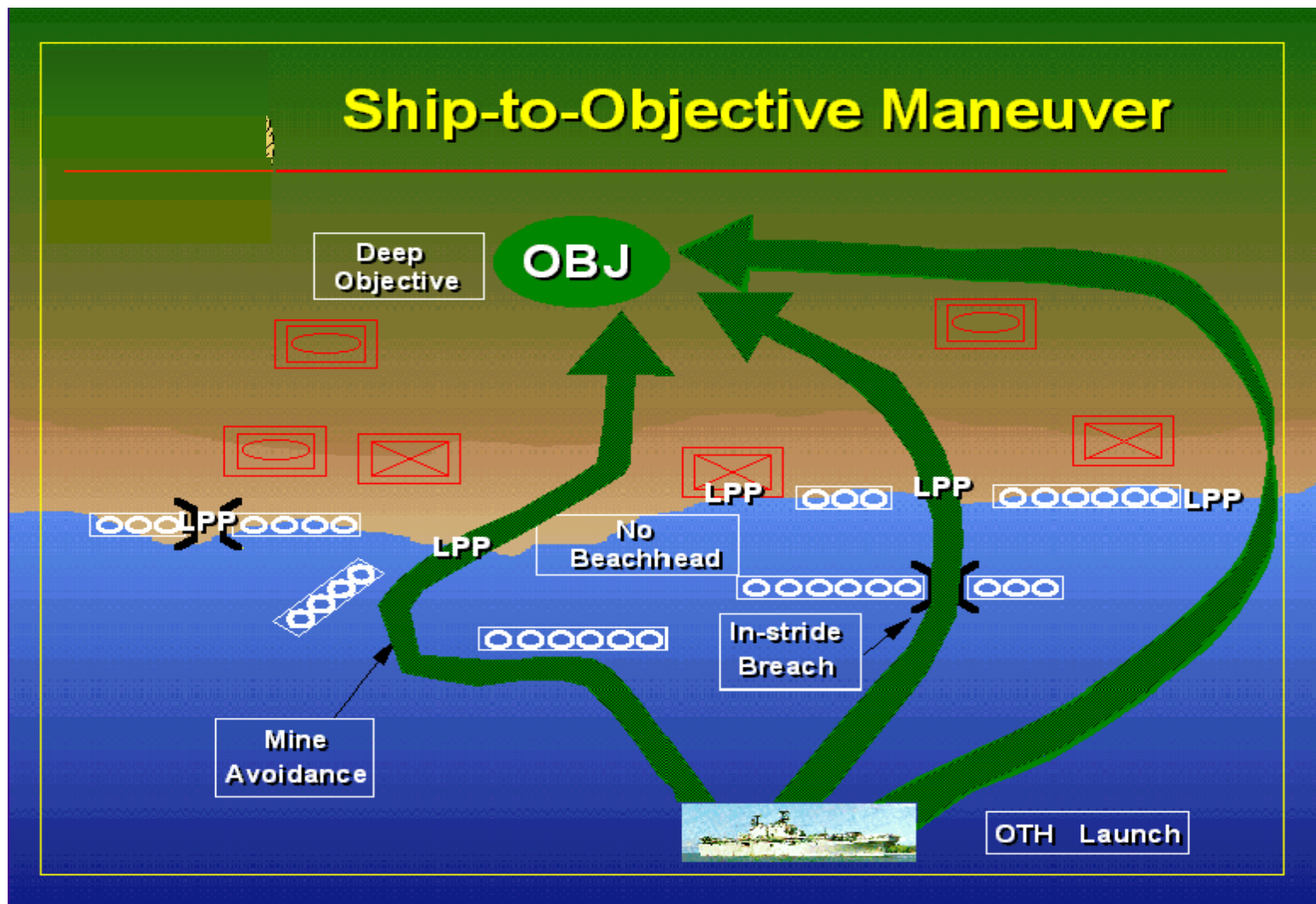


# *Overview*

- **Mission Requirement**
- **Projected Environment**
- **Limitations**
- **Potential Solution**
- **UUV Mission and Desired Parameters**



# *Mission Requirement*





**Objective**

~5 kilometers

LPS Secondary

Phase Line  
Bravo

Phase Line  
Alpha

Threat Radius

LPS

Reefs  
Poor Bottoms  
Hazards to Navigation.  
Ordnance Disposal  
Etc.

Secondary

DP

Transition point

Departure  
Point (DP)

Primary

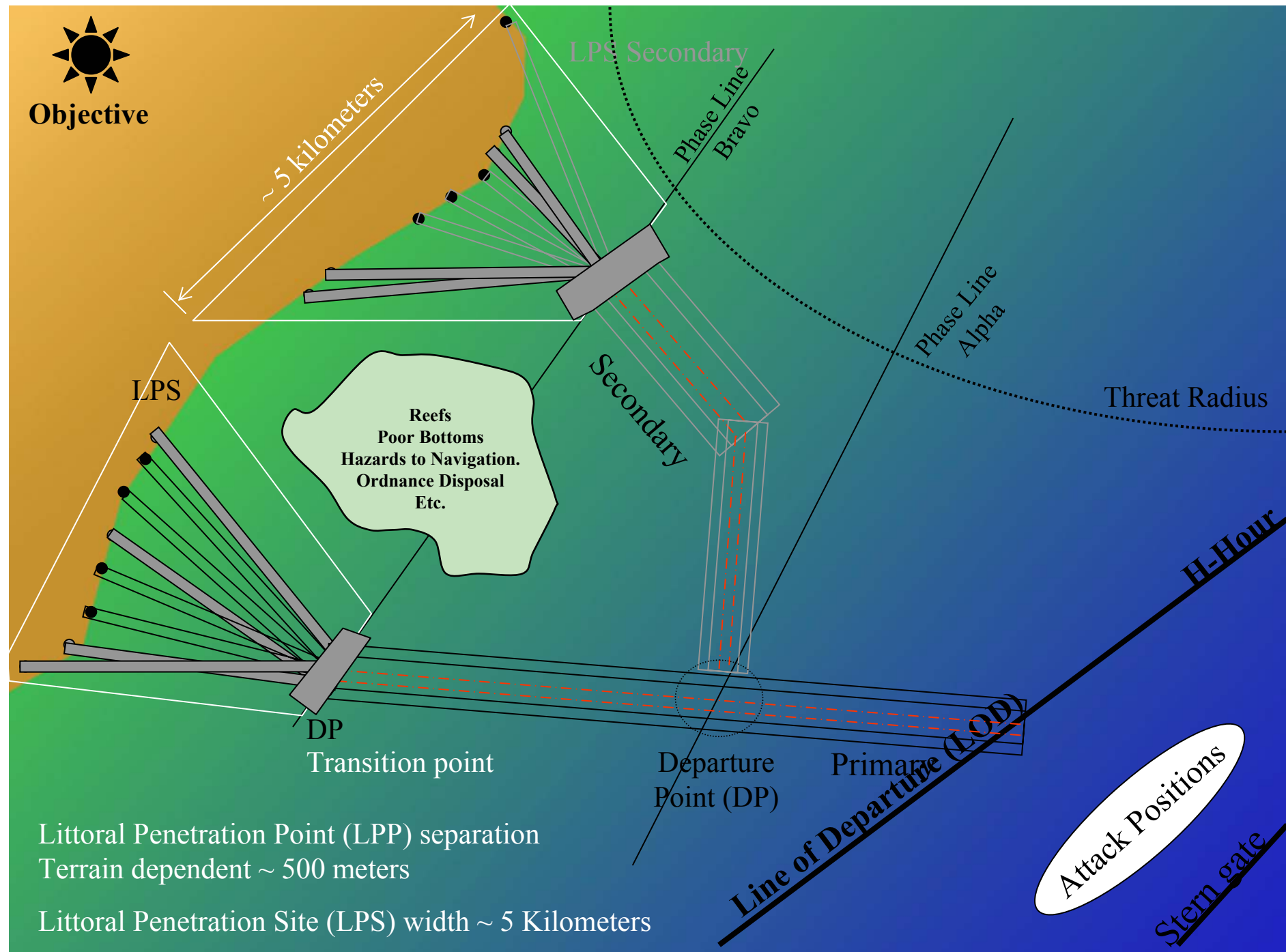
Line of Departure (LOD)

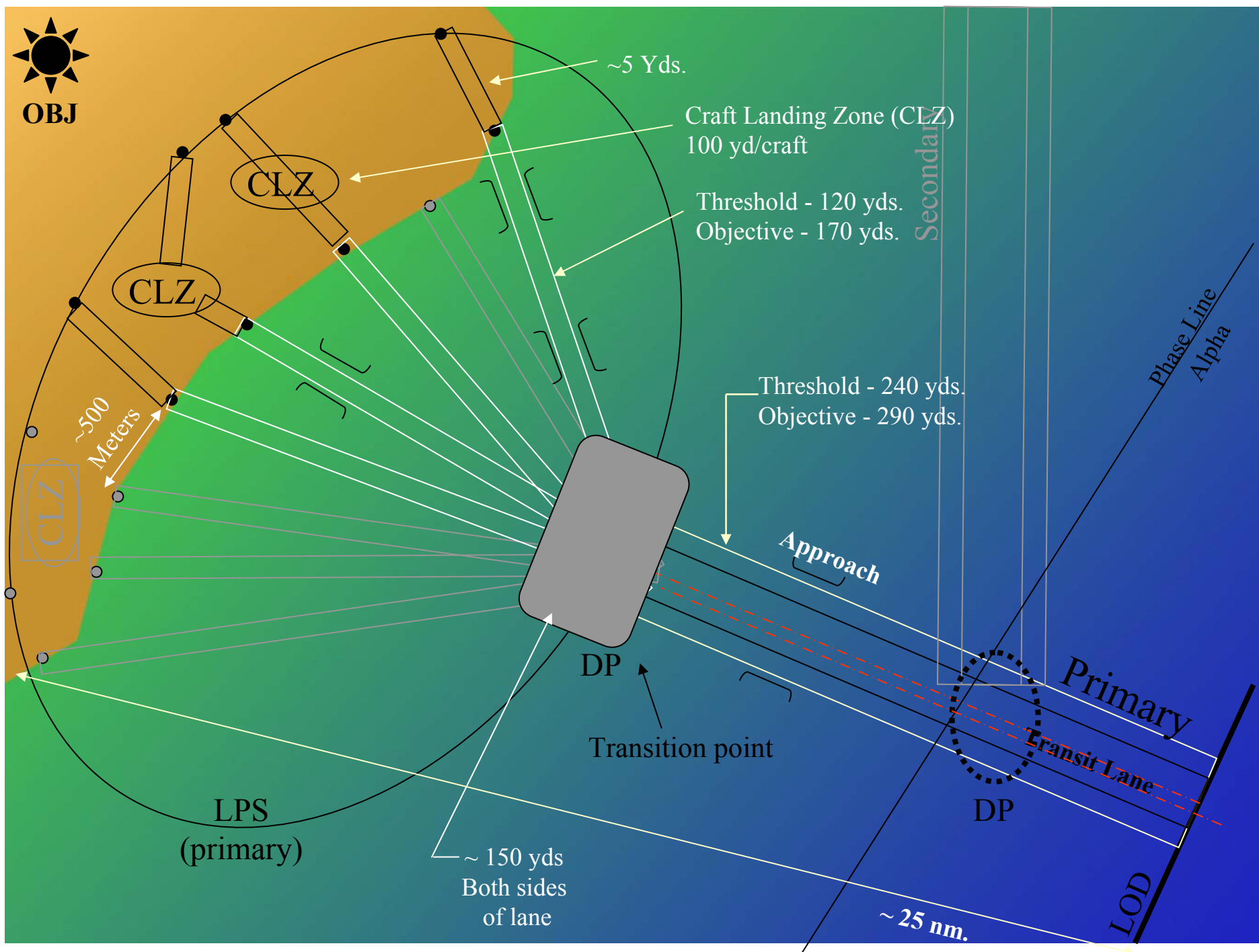
Attack Positions

Stem gate

Littoral Penetration Point (LPP) separation  
Terrain dependent ~ 500 meters

Littoral Penetration Site (LPS) width ~ 5 Kilometers





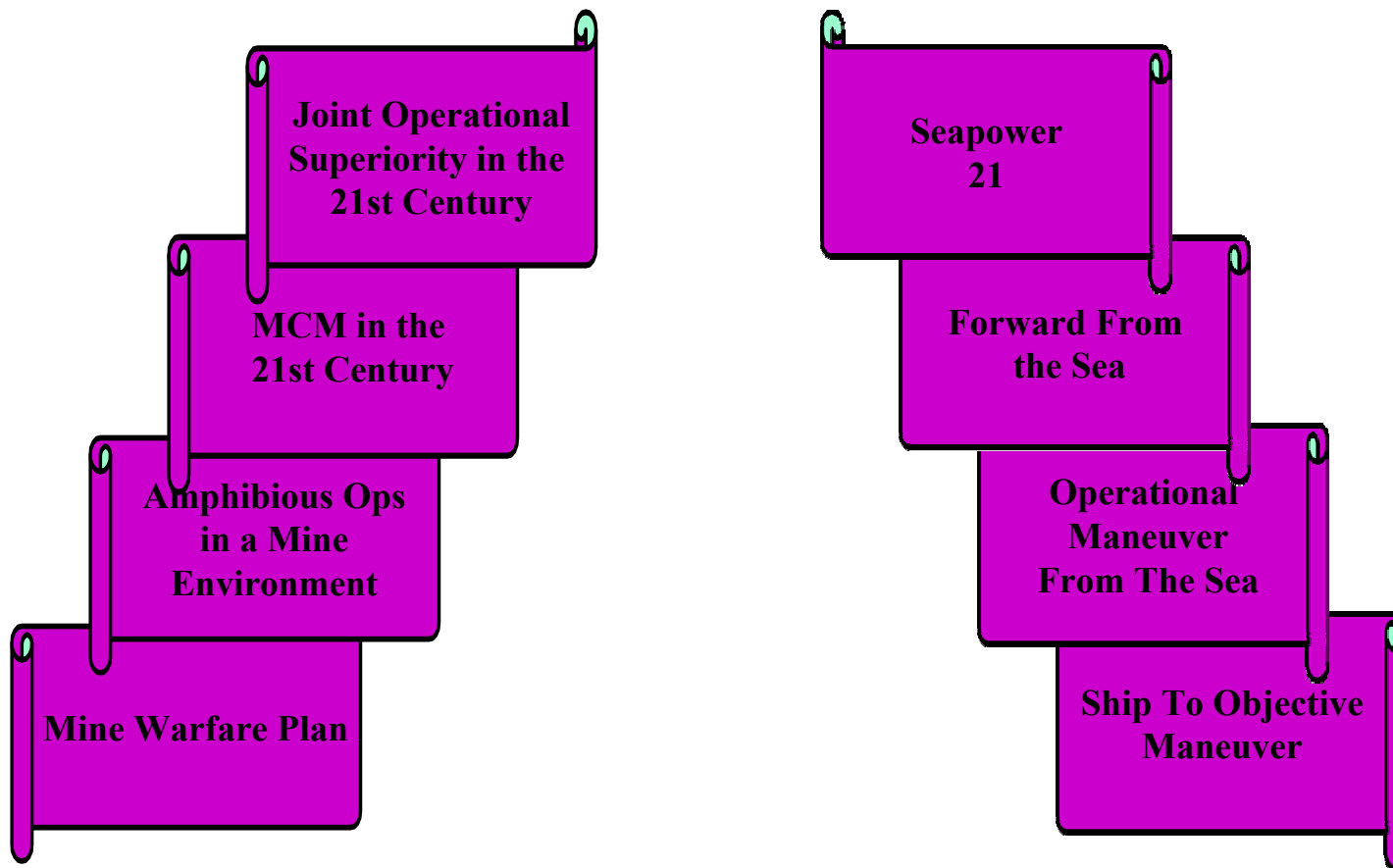
**IN SUPPORT OF NAVAL CONCEPTS:  
TO GET TO THE OBJECTIVE**



**YOU MUST SUCCESSFULLY TRANSIT  
THE VERY SHALLOW WATER ZONE**



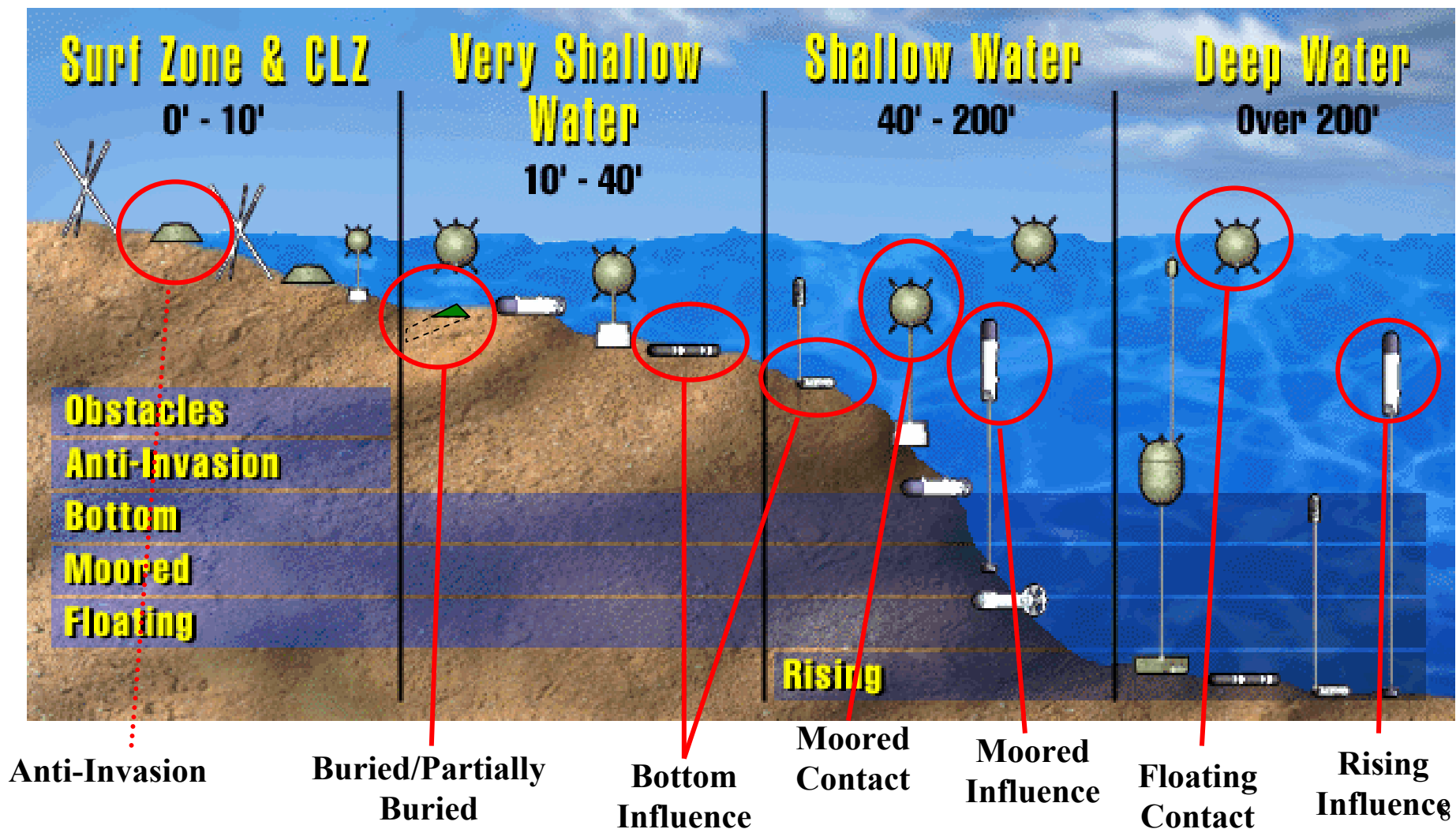
# *Supporting Doctrine and Warfare Concepts*



- Valid mission needs exist
- Concept-based needs and requirements incorporated into naval amphibious and mine warfare concepts and doctrine



# *Projected Environment*







# *Limitations*

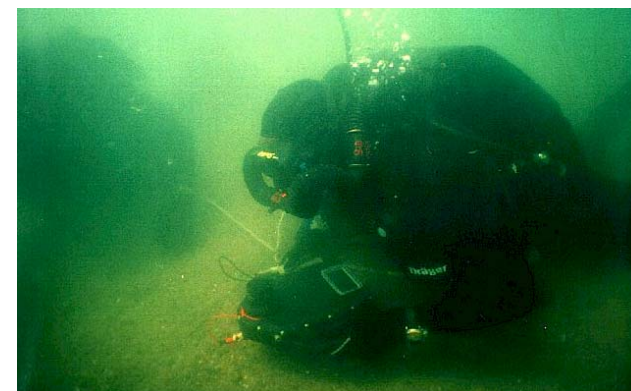
- **Divers**

- Conduct missions in multiple dive pairs to perform search and clearance operations
- Inherent risks to this role
  - Inefficient
  - Dangerous
  - Manpower intensive
  - Difficult to avoid detection
  - Highly vulnerable to hostile forces



- **Marine Mammal Systems**

- Pre- and post-assault VSW MCM against moored and bottom mines; minefield recon
- Inherent risks to this role
  - Large footprint
  - Manpower intensive
  - Expensive to maintain
  - Limited duration





## *Potential Solution*

**“While admittedly futuristic in vision, one can conceive of scenarios where UUVs sense, track, identify, target, and destroy an enemy – all autonomously and tie in with the net-centric battlespace.”**

***Excerpt from UUV Master Plan***



# *Unmanned Underwater Vehicles*

- **The UUV Will Reduce Dependence on Diver Search & Clearance Operations**

- Safer
- Faster
- Less Manpower Intensive



- **Use of UUVs to perform clearance/neutralization operations will enable on-scene commanders to use divers or mammals to reacquire/ neutralize mines *only when deemed essential***

- **Shortfalls:**

- **Current UUV Technology Has Not Yet Demonstrated Full Mission Profile Capability to Reacquire and Neutralize All Types of Mines in the Harsh MCM Environments Found in the VSW Region**



# *UUV Neutralization Mission*

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- **Reacquire and neutralize mines in the water column and on the sea floor in the VSW Zone (between the 10 ft and 40 ft curves)**



# *Key Program Considerations*

- **Low Vehicle Unit Cost – vehicle loss is not mission catastrophic**
  - Vehicle may be expendable
- **Performance in Multiple MCM environments**
  - Environmental Extremes
  - Wide Variety of Bottom Types
  - Diverse Threat
- **Combat Rubber Raiding Craft (CRRC) deployable**
- **Minimize dependence on divers and marine mammals to perform neutralization missions**
- **Complementary with other fleet MCM systems**



## *Summary*

- **The UUV (N) System shall be capable of performing mine reacquisition and neutralization in support of amphibious landings and MCM operations in the VSW zone**
- **Complement VSW MCM Toolbox**
- **Augment Diver & Dolphin Capability**
- **Reduce Risk to Transitioning Forces**
- **Speed Up Tactical Timeline**